Özgün araştırma / Original research

Enurezisli erişkin hastalarda biofeedback tedavisinin etkinliği

Effectiveness of biofeedback therapy in adult patients with enuresis

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Özet

Amaç: Çalışmanın amacı; primer monosemptomatik enurezisli (MsE) erişkinlerde, biofeedback tedavisinin etkinliğini araştırmaktır.

Gereç ve Yöntemler: Prospektif dizaynlı bu çalışmada, primer MsE'li erişkin hastalar çalışmaya dahil edildi. Nörojen mesaneli, gündüz işeme problemi olan, anatomik anomalisi olan ve enurezisle ilişkili başka hastalığı olan hastalar çalışmaya alınmadı. Kriterlere uyan 13 hastanın demografik verileri kaydedildi. Biofeedback öncesinde ve tedavinin bitiminden sonra 3. ayda, hastaların enurezis sıklıkları, üroflovmetri değerleri, rezidüel idrar miktarları (PVR) ve total mesane hacmi (TMH) (işeme hacmi + PVR) değerlendirildi. Biofeedback tedavinin başarısı, ayda bir kez veya daha az gece ıslatması olarak tanımlandı.

Bulgular: Altı erkek ve yedi kadını içeren toplam 13 hastanın yaş ortalaması 29.2 ± 8.2 idi. Biofeedback tedavisi öncesinde aylık enurezis sıklığı 23.4 ± 5.9 iken, tedavi sonrasında 5.2 ± 8.9 olarak hesaplandı (p=0.002). Biofeedback tedavisi öncesi ve sonrasında; PVR, maksimum idrar akım hızı (Qm) ve ortalama akım hızı (Qa) açısından fark saptanmadı. Biofeedback tedavisi sonrası, TMH'nin 277.8 ml'den 329.9 ml'ye yükseldiği belirlendi (p=0.001).

Sonuç: Primer MsE olan erişkin hastalarda biofeedback tedavisi, güvenli basit ve kolay uygulanabilen bir tedavi seçeneğidir. Mesane kapasitesini artırdığı saptanan bu tedavi, bu özel hasta grubu için önerilebilir.

Anahtar Kelimeler: Biofeedback, erişkin enurezis, mesane kapasitesi, monosemptomatik enurezis, üroflovmetri

Abstract

Objectives: To investigate the effectiveness of biofeedback therapy for adult patients with primary monosymptomatic enuresis (MsE).

Material and Methods: In this prospective design study, the adult patients with primary MsE were included in the study. Patients with neuropathic bladder, daytime voiding problems, anatomical pathology and enuresis-related other diseases were excluded from the study. The demographic data of 13 adult patients who meeting the criteria were recorded. The outcomes of enuresis frequency, uroflowmetry parameters, post-void residual urine (PVR) and total bladder volume (TBV) (voided volume + PVR) were evaluated before and at the end of the three month after biofeedback treatment. One or less enuretic night in a month was defined as the success of the biofeedback therapy.

Results: Including 6 men and 7 women, the mean age of 13 patients was 29.2 ± 8.2 years. Before biofeedback therapy the incidence of enuresis was 23.4 ± 5.9 (monthly), while after treatment this was calculated as 5.2 ± 8.9 (p=0.002). There was no significant difference found between before and after biofeedback therapy in terms of PVR, maximum flow rate (Qm) and average flow rate (Qa). The mean TBV of patients increased from 277.8 ml to 329.9 ml after biofeedback treatment (p=0.001).

Conclusion: Biofeedback therapy is a safe, simple and minimally invasive treatment modality in adult patients with primary MsE. This treatment, which was found to increase TBV, may be recommended for this special patient group.

Keywords: adult enuresis, biofeedback, bladder capacity, monosymptomatic enuresis, uroflowmetry.

Introduction

Enuresis is a common and important disease in the childhood period. Any urine leak during sleep without lower urinary tract symptoms (frequent urination, urgency, etc.) is named monosymptomatic enuresis (MsE) (1). The MsE prevalence in 5 year old children is 15-20%, though it spontaneously resolves with time and the incidence in adults is around 2% (2). As it can cause loss of confidence and intense psychological stress in children, it is recommended that MsE be treated at 6-7 years of age (3). However, there is no consensus related to treatment of enuresis in adults.

Biofeedback is a method of muscle training that transforms myoelectric signals in muscles into visual and audible signals. Biofeedback can be used to both strengthen weak muscles and reduce the tonus of spastic muscles (4). Biofeedback treatment has been shown to be effective in treatment of non-monosymptomatic enuresis (NMsE) and chronic urination dysfunction by a variety of publications. In NMsE patients, EMG biofeedback treatment was reported to resolve the enuresis component by 64% (5,6). In this study we planned to research the efficacy of biofeedback treatment for primary MsE in adults.

Material and Methods

After receiving permission from Çanakkale Onsekiz Mart University Clinical Research Local Ethics Committee, participants provided written consent in accordance with the Helsinki Declaration. The characteristics of adult patients with primary MsE diagnosis, such as urination habits, medication history, enuresis treatment history and heavy sleep problems, were recorded. Patients with neurogenic bladder, daily urination problems or anatomic urological anomalies were not included in the study. Before uroflowmetry, patients typically waited until they felt the urge to urinate. Uroflowmetry measurements, upper urinary tract evaluation with ultrasound and post void residual urine (PVR) tests were performed. The total of the voided urine volume and PVR was assessed as total bladder volume (TBV) (7).

For biofeedback therapy patients were in supine position. Two surface EMG electrodes were positioned immediately in front of the anus at 3 and 9 o'clock positions, with another 1 placed on the leg. Later the pelvic floor muscles were tensed, as taught by the urotherapist, the patient was told to consider the object on the screen represented them and were told to try to avoid obstacles. Each session lasted nearly half an hour and was performed once a week. The patients were advised to practice the taught exercises at home for half an hour every day. At the end of six weeks of biofeedback treatment, the patients were advised to continue the exercises as before. Assessments were performed to compare before treatment and check-up data from 3 months after the end of treatment. After biofeedback therapy, if enuresis incidence was once or less per month, the treatment was assessed as successful (5).

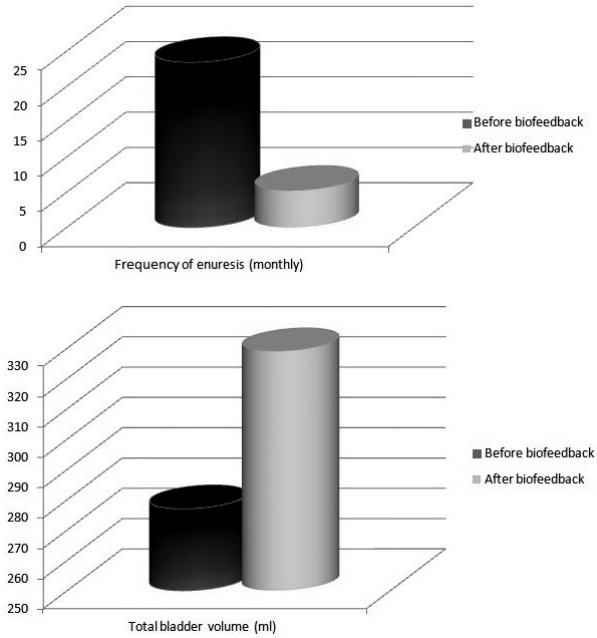

Figure 1: The outcomes of enuresis frequency and total bladder volume before and after biofeedback treatment are demonstrated.

Statistical Analysis

Statistical analysis was completed using the SPSS 19.0 statistical software package program (IBM Corp., Armonk, NY, USA). All quantitative data are given as mean ± standard deviation, qualitative data are given as number and percentage. To compare parameters from before and after biofeedback treatment, as homogeneity and normality were not present, parametric tests were not used and the nonparametric Wilcoxon test was used. All statistical analyses were two-tailed and a p value below 0.05 was assessed as a statistically significant result.

Results

The mean age of the 6 men and 7 women in the study,

a total of 13 patients, was 13.2 ± 8.2 years. Five patients had deep sleep problems. When patients were asked about previous treatment, 2 patients had not received treatment, and 5 patients had only received desmopressin treatment. The remaining 6 patients had received desmopressin treatment in addition to treatments like alarm therapy, imipramine hydrochloride and oxybutynin at different times. While 8 patients did not benefit from desmopressin treatment, 3 patients benefitted from treatment but ceased taking medication due to side effects. The basic characteristics of patients are summarized in Table 1.

Table 1: Basic demographic characteristics of the patients.

	Number of Patients (total = 13)
Gender	
- Male	6 (%46.2)
- Female	7 (%53.8)
Age	
- Mean	29.2
- Standard deviation	8.2
- Minimum-Maximum	18-42
Body mass index	
- Low (<5th percentile)	2 (%15.4)
- Normal (5-84 percentile)	8 (%61.5)
- Overweight (85-95 percentile)	3 (%23.1)
- Obese (> 95th percentile)	0
Heavy sleeper	
- Yes	5 (%38.5)
- No	8 (%61.5)
Previous treatments	
- No Treatment	2 (%15.4)
- Only desmopressin treatment	5 (%38.5)
- Desmopressin and other treatments	6 (%46.1)
The results of previous treatment	
- No Treatment	2 (%15.4)
- Could not benefit from treatment	8 (%61.5)
- Treatment was stopped because of side effects	3 (%23.1)
The success of biofeedback therapy	
- Successful	8 (%61.5)
- Unsuccessful	5 (%38.5)

The mean monthly enuresis incidence reduced from 23.4 to 5.2 with biofeedback treatment (p = 0.002). While biofeedback treatment was successful for 8 patients (61.5%), treatment was unsuccessful in 5 patients (38.5%). There was no significant change in patient urine flow rates before and after treatment. Voided urine volume and TBV increased by a significant amount after treatment. The clinical and measured values before and after biofeedback therapy are given in Table 2.

Discussion

This paper is the first to research the efficacy of biofeedback therapy for adults with primary MsE. Though enuresis is a common disease in the childhood period, it may be observed at rates of 1-2% in adults and may cause serious social and psychological effects (2,8). According to the current definition, in those above 5 years of age, without any daily urination problem, urine leakage during sleep is called MsE (1). In situations where symptoms do not resolve within 6 months, primary enuresis is in question. Three basic mechanisms are held responsible for the etiology of primary MsE; 1: increasing urine output at night, 2: low bladder capacity or increased detrusor activity and 3: arousal disorders (3).

When MsE diagnosis is made, before definitive treatment supporting treatments (reducing fluids before sleep, avoiding foods that irritate the bladder, timed urination, etc.) should be considered (3). Though supporting treatments are beneficial, efficacy is low and so they are generally used as an aid to medical or alarm therapy. Alarm therapy appears to be a good choice with a 60% full response rate. However, interruption of sleep, 5-12 week treatment requirements and patient compliance problems limit its use. In our study of 13 patients only 2 had a previous history of alarm therapy use.

In nearly 2/3 of monosymptomatic enuresis patients, the problem is increased urine production at night and for this patient group desmopressin is a good treatment choice. However, in 30% of patients resistance is observed. In our study, 8 patients did not benefit from desmopressin, while 3 patients ceased taking the medication due to side effects in spite of benefiting from treatment. Hamano et al. found that bladder capacity was lower in patients who were desmopressin resistant. Additionally in some studies patients with low bladder capacity have been shown to be resistant to desmopressin, anticholinergic and alarm therapy (2,9).

Current research by Ebiloğlu et al. showed that biofeedback therapy for non-MsE patients resolved the enuresis component by 64% (5). In our study we found the success rate for enuresis was 61.5%. A variety of studies

Table 2. Evaluation of biofeedback treatment results in terms of clinical and non-invasive urodynamic parameters.

	Before Biofeedback	After Biofeedback	p value*
Enuresis frequency (monthly)			
- Mean	**23.4**	**5.2**	**0.002**
- Standard deviation	**5.9**	**8.9**	
- Minimum-Maximum	**12-30**	**0-25**	
Voided volume (ml)			
- Mean	**254.7**	**310.6**	**0.001**
- Standard deviation	**50.11**	**58.1**	
- Minimum-Maximum	**186-350**	**218-389**	
Post-void residual urine (ml)			
- Mean	**23.1**	**19.2**	**0.054**
- Standard deviation	**14.5**	**10.4**	
- Minimum-Maximum	**0-50**	**0-40**	
Total bladder volume (ml)			
- Mean	**277.8**	**329.9**	**0.001**
- Standard deviation	**53.2**	**61.3**	
- Minimum-Maximum	**195-360**	**218-409**	
Maximum flow rate (ml/sn)			
- Mean	**26.5**	**25.9**	**0.943**
- Standard deviation	**6.3**	**7.6**	
- Minimum-Maximum	**16-35**	**14-36**	
Average flow rate (ml/sn)			
- Mean	**15.4**	**15.6**	**0.309**
- Standard deviation	**3.3**	**3.9**	
- Minimum-Maximum	**10-20**	**9-22**	

*Statistically significant at $p < 0.05$. This p-value is compared to the parameters before and after the biofeedback therapy

have shown that biofeedback therapy causes functional changes in the bladder. Hoekx et al. in research on oxybutynin resistant MsE children stated that with biofeedback therapy small bladder capacity is normalized resolving enuresis (10). A study by Kibar et al. found that biofeedback therapy reduced the residual urine amount in children with dysfunctional urination (11). In our study, while voided urine volume and TBV increased by a statistically significant amount after biofeedback therapy, residual urine volume did not change.

In conclusion, in adults primary MsE disease occurs in a considerable amount of the population and patients are in a very problematic situation. Due to psychological stress and confidence problems linked to MsE in children, treatment is recommended at the age of 6-7. Adult enuresis treatment has been ignored in research; however it is a significant health problem. Biofeedback therapy, observed to increase bladder capacity, should be remembered as a simple, uncomplicated, and easily applied treatment method with high success rate for adult MsE patients.

Conflict of Interest

None of the contributing authors have any conflict of interest, including specific financial interests or relationships and affiliations relevant to the subject matter or materials discussed in the manuscript.

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